

SEMICONDUCTOR DEVICE INCLUDING MOSFET
HAVING BAND-ENGINEERED SUPERLATTICE

Abstract of the Disclosure

A semiconductor device includes a substrate, and at least one MOSFET adjacent the substrate. The MOSFET may include a superlattice channel that, in turn, includes a plurality of stacked groups of layers. The MOSFET may also include source and drain regions laterally adjacent the superlattice channel, and a gate overlying the superlattice channel for causing transport of charge carriers through the superlattice channel in a parallel direction relative to the stacked groups of layers. Each group of the superlattice channel may include a plurality of stacked base semiconductor monolayers defining a base semiconductor portion, and an energy band-modifying layer thereon. The energy-band modifying layer may include at least one non-semiconductor monolayer constrained within a crystal lattice of adjacent base semiconductor portions so that the superlattice channel may have a higher charge carrier mobility in the parallel direction than would otherwise occur.